Proceedings of the Iowa Academy of Science

Volume 2 | Annual Issue Article 40

1894

Geological Section of the Y.M.C.A. Artesian Well at Cedar Rapids, Iowa

Wiliam Harmon Norton

PLATE XX.

Figure 1. *Melonites multipora.*
1*a*. Ambulacrum (enlarged).
1*b*. Apical disk (enlarged).
1*c*. Interambulacral plate (enlarged).
Figure 2. *Oligoporus danæ.*
2*a*. Ambulacral plates (enlarged).
2*b*. Interambulacral plates (enlarged).
Figure 3. *Archæocidaris wortheni.*
3*a*. Ambulacral plates (enlarged).
3*b*. Interambulacral plates (enlarged).

GEOLOGICAL SECTION OF THE Y. M. C. A. ARTESIAN WELL AT CEDAR RAPIDS, IOWA.

BY WILLIAM HARMON NORTON.

The record of this well is of special importance because it supplements and corrects the published records of the earlier city wells. It is based almost wholly upon drillings taken at frequent intervals directly from the sand pump. Unfortunately samples of the first ninety feet were not saved, within which space the drill must have passed through the beds lying between the lowest recognized Devonian and the Le Claire beds of the Upper Silurian. The interval, in part at least, can be supplied from outcrops in the immediate vicinity. The geological section at Cedar Rapids is as follows:

	FEET.
Fayette breccia including the Gyroceras beds of Calvin	11
Independence shales (Kenwood beds)	30
Otis limestone (*Spirifer subumbonus* beds)	30

Within a block of the well there outcrops, three feet above low water in the Cedar river, a locally persistent layer of the Otis; a brown, non-magnesian limestone macrocrystalline heavily and irregularly bedded and with large calcite nests. This is underlain at water level by a buff thin-bedded limestone. The brown limestone makes a locally persistent horizon not over twelve feet from the base of the Otis, where at numerous exposures along the Cedar below town, noticeably at Otis, it passes into a heavily-bedded, soft, buff magnesian limestone. Between the outcrop of this buff limstone, which we may

designate as the Lower Otis, and the western boundary of the Le Claire and Mount Vernon beds, there extends along Big creek for ten miles an outcrop of an unfossiliferous, hard, heavily-bedded, drab limestone fifty feet in thickness, termed the Bertram beds in the author's report on the Geology of Linn county.*

Supplying, therefore, the upper ninety feet of the well section from the vicinal strata, we have the following succession:

Number.		Thickness in feet.	Depth of low'r limit.
	Otis limestone	29?	29?
	Lower Otis limestone	20?	49?
	Bertram limestone	41?	90?
17	*a* Chips of dark, slate colored, non-magnesian limestone; argillaceous, hard, compact sub-conchoidal fracture, pyritiferous; showing junction surfaces with green clay. *b* Smaller chips of light buff magnesian limestone, not porous; lustre earthy. *c* Green clay	5?	95
16	Magnesian limestone, or dolomite, light buff, slightly vesicular, lustre earthy; samples at 95, 105 and 115 feet	25	120
15	Dolomites, buff, pinkish and grey in color; mostly vesicular, sub-crystalline and sub-translucent. Seventeen samples	324	444
14	Dolomite, hard, grey, argillaceous, with argillaceous powder	6	450
13	Bluish shale with intercalated limestones at 525, 595 and 595 feet, in all seven samples	270	720
12	Dolomites; rough, hard. Six samples	65	785
11	Limestones, magnesian, some cherty. Eight samples	135	920
10	Limestones, briskly effervescent, earthy; in flaky chips, bluish grey in color	15	935
9	Shale and limestone, brown, petroliferous	15	950
8	Shale, blue	40	990
7	Limestone, bluish-grey, in flaky chips; briskly effervescent. Samples at 990 and 1,000 feet	35	1025
6	Sandstone, of clean white quartz sand; grains rounded and ground	20	1045
5	Dolomite, grey, cherty; samples at 1,045, 1,080, 1,100 and 1,115 feet	85	1130
4	Dolomite, arenaceous; in fine buff dolomitic powder with some quartzose grains	40	1170
3	Sandstone, in fine, light yellow quartz sand of angular grains, with some dolomite; samples at 1,170, 1,185 and 1,200 feet	55	1225
2	Dolomite, grey; samples at 1,225, 1,240, 1,260, 1,265, 1,280, 1,290, 1,310, 1,330, 1,350, 1,360, 1,380 and 1,390 feet; at 1,240 and 1,380 feet arenaceous	175	1400
1	Sandstone, of clean white quartz sand similar to No. 6 but coarser, samples at 1,400, 1,420, 1,435 and 1,445 feet; at 1,435 feet slightly calciferous	62	1462

* Iowa Geol. Surv., vol. IV., p. 135. 1895.

Taking No. 17 to represent the base of the Bertram beds the succeeding numbers are referred to the following formations:

		THICKNESS IN FEET.
Nos. 16-15.	Niagara and Le Claire	349
Nos. 14-13.	Maquoketa	276
No. 12.	Galena	65
No. 11-7.	Trenton	240
No. 6+.	St. Peter	25
Nos. 5-4.	Upper Oneota	125
No. 3.	New Richmond	55
No. 2.	Lower Oneota	175
No. 1.	Upper Saint Croix to bottom of well, 1,462 feet	62

The first artesian well at Cedar Rapids, which reached the Algonkian floor, disclosed the base of the sandstone referred to the Upper Saint Croix at 1,690 feet and the following strata succeeding:

FORMATION.		THICKNESS IN FEET.
Shales.	Lower St. Croix	100
Sandstones.	Potsdam	360
Quartzite.	Sioux, to base of well at 2,225 feet	75

Points of special interest in the above section are:

(1). The thickness of the Niagara-Le Claire. Being but about ten miles distant from the thickest known outcrop of the Le Claire, where it aggregates ninety feet, it is believed that we have here a reliable measure of the probably maximum thickness of the formation; verifying White's estimate of 350 feet.

(2). The thickness of the Maquoketa, previous estimates not having exceeded 100 feet.

(3). The clear distinction between the Galena and Trenton, not marked in the record of the first artesian well*. In the driller's record of this well as published by R. E. Call†, the entire Galena-Trenton limestones are termed "sandstones."

(4). The presence near the base of the Trenton of a petroliferous shale, in other states the source of natural gas and oil.

(5). The reduction in the thickness of the Saint Peter given in the records of the first well at 116 feet.

(6). The division of the Oneota by a well defined sandstone. The equivalent of the New Richmond sandstone of Minnesota. The Upper and the Lower Oneota dolomites, whose joint thickness is 300 feet, were published as "sandstones" in the record of the first artesian well‡.

* Iowa Geol. Surv., vol. III, p. 195. 1895.

† Proc. Iowa Acad. Sci., vol. I, pt. ii, p. 58. 1892.

‡ Loc. cit., 58.